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ABSTRACT

Throughout history, famine has been linked to many of the most severe crises of humanity. Even with millenary of collective experience, the reaction of the world community to the an intense food crises fails to address the long-term impacts of famine. As governments and populations strive to cope with famine, many long-term changes take place in those nations suffering from famine. The scale of these changes ranges from microeconomic to macroeconomic changes and include social and political changes in the state and in the dependency status of the nation. Studies have shown changes in land ownership (Chambers and Pacey, ed., 1981), relative gain in wealth by the wealthy (Crawford, 1980), herd reduction, and migration of the population in search of wages and food. Macroeconomic changes such as internal improvements within the nation take place as governments try to secure the nation from future episodes of famine. Many famines have followed civil wars or threats from invasion, and some governments have been weakened during periods of famine. Dependency status results when developing nations serve the interests of more powerful nations, resulting in less economic development. Since no large population in today's world is dependent on local natural resources to the extent that a failure of nature must lead to famine, numerous observers (O'Brien, 1985; Shindo, 1985) say the increase of famines in today's world is due to social focus. (SM)

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# Long-Term Impacts of Famine

## Enduring Disasters and Opportunities for Progress

Carl C. Mabbs-Zeno

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## ABSTRACT

Famines have numerous stages, each of which is characterized by a time of occurrence, and have various levels of durability, controllability, and reversibility. This report focuses on the relatively durable elements of famine, such as changed population structure, to identify policies which, if implemented before, during, and after the central famine episode, could mitigate long-term problems and take advantage of possible benefits.



Keywords: Famine, food aid, food crisis.


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# Long-Term Impacts of Famine

## Enduring Disasters and Opportunities for Progress

Carl C. Mabbs-Zeno

"Indeed, disasters have consistently provided opportunities for the initiation of radical changes in poor societies that enhance development far beyond the normal, pre-disaster pace." --Protein Caloric Advisory Group of the United Nations.

### INTRODUCTION

The earliest record of famine comes from the Nile valley in 4247 B.C. (4). 1/ In the ensuing millennia, famine marked many of the most severe crises of humanity, punctuating history with dreadful memories even more enduring than the statistics on loss of life would suggest. Such intense social disruptions bear a potential for controlled change which has been pursued at least since the overthrow of the Wang Mang dynasty in China during a famine in A.D. 23 (118). People, however, seldom prepared for the opportunities for change that were presented by the food crises. An early exception came from Ethiopian priests who, in A.D. 1625, recognized the potential that famine provided for gaining support for their apocalyptic message (95). Unfortunately, famine continues, erratic but incessant, even though technological advances have assured the capacity to produce aggregate food surplus, to monitor local needs, and to distribute aid. And, even with millennia of collective experience, our reaction to the most intense food crisis generally fails to address long-term impacts or to grasp the opportunities presented by catastrophe.

The term "famine" generally refers to the most extreme incidents of starvation and associated diseases. In previous centuries, data were too poor to permit much assessment of the intensity of specific famines. Uniform criteria for what was "extreme" are impossible, and designation of these famine periods remains subjective. Even in the 20th century, famine has been poorly documented with estimates of losses varying widely among observers. For example, the official estimate of deaths during the 1943 Bengal famine was 26,000; however, recent researchers accept figures of 1.5 million or more (4; 108, p. 134; 99). The number of casualties was actively concealed by local officials during the Chinese famine of 1959-60, delaying national recognition of the scale of the crisis (134). Data from the 1982 Chinese census suggest at least a doubling of previous estimates of losses in that famine (3, 7).

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1/ Italicized numbers in parentheses identify literature cited in the References at the end of this report.

Famine is difficult to define quantitatively, but it clearly refers to episodes of unusually high mortality in contrast with chronic hunger or malnutrition. Economic theories based on tendencies toward equilibrium are limited in their usefulness for analysis of famine because it is always episodic. Neoclassical economists generally regard famine as an extreme, though temporary, drop in the path through time of economic indicators which can be predicted only in a probabilistic sense (93). Famine control strategies are based on raising the value of economic indicators or on reducing their variation.

Famine, however, like war and a few other types of acute crises, is far more than a bend in the path toward neoclassical equilibrium. Such crises dominate the history and development of many economies, prevailing over the marginal influences of traditional policy efforts which are directed toward more normal times (68). Nearly all research on famine is based on case studies of a single episode or on a series of episodes in a single location. This method is inappropriate for developing a theory of famine. Notable exceptions to this deficiency do exist (113, 108, 34, 36), but these works tend to focus strongly on analysis of causality and on policies for reducing famine reoccurrence and intensity, stopping short on other important questions. In particular, the enduring impact of famine on an economy has not been incorporated into any general model with consideration to exploiting the presence of crisis to promote development. If famines are important determinants of economic evolution, then actions to shape their influence may be useful.

## THEORY OF FAMINE CAUSALITY

The early histories of many cultures include reports of famine. More than 1,800 famines appear in Chinese records since 108 B.C. (75). British history notes nearly 100 famines since A.D. 54 (99). Over 120 Soviet famines have been chronicled since A.D. 971 (36). Indian citations go back to A.D. 297 (36) and Ethiopia recognizes famine from A.D. 1252 (95). These earlier experiences shared the fundamental consequences of 20th century famine, but their causes are often modeled separately. Watts, for example, wrote of "precapitalist" famines whose occurrence is adequately explained by resource shortages in contrast to "colonial" and modern famines whose origins lie in social failures (137). Improved production technology and improved capacity to redistribute food has shifted responsibility to social institutions. However, there is no assurance that the food will be used to protect against starvation. Numerous observers have claimed that an increase in famines from social causes has contributed to a rise in famine vulnerability in particular locations (91, 115, 119). But, my recent review, with its specific definitions, was unable to confirm that occurrence of famine was increasing anywhere (73).

Various strategies have been applied to reduce the likelihood of famine resulting in relative security since 1850 in Western Europe, since 1950 in India and Eastern Europe, and since 1980 in China. The unpredictable institutional breakdown that accompanies war continues to threaten civilians with famine, such as during World War II in Greece, the Netherlands, Vietnam, Bengal State (India), and Honan Province (China). Famine caused approximately 6 million deaths during World War II.

Almost 50 million people have died in famines since 1940 (table 1). Several cases where famine did not arise in spite of severe stress are also noted in

table 1. These incidents highlight the association of civil war and modern famine. Kampuchea, Biafra (Nigeria), Uganda, Ethiopia (in 1983-85), Sudan, and Mozambique had armed rebellions beginning shortly before famines. These rebellions accounted for many famines but for only a tenth of the famine casualties and for an even smaller proportion of insurrections since World War II. Although militarization has been firmly linked to famine (115), not all conflicts lead to famine. Thus, a model of famine causality must consider more than the factors that bring war.

Causes of famine include those underlying or ultimate factors that create vulnerability and the catalytic or proximate factors that touch off a specific occurrence (127). Some researchers consider broad economic development as the best strategy to eliminate the ultimate causes of famine, but the relative food security of India and China today suggests that considerable protection is possible even at a modest level of general development.

The earliest theories throughout the world on why famines occur came from theological interpretations, generally resulting in prevention strategies

Table 1--Famine deaths since 1940

| Area affected | Dates | Excess deaths | References |
|---|---|---|---|
| | | Thousands | |
| Honan (China) | 1941 | 2,500 | (99) |
| Greece | 1941-43 | 500 | (99) |
| Bengal (India) | 1943 | 1,500 | (4, 27) |
| | | 3,000 | (108) |
| Tanzania | 1943-44 | * | (109) |
| Netherlands | 1943-44 | 10 | (121) |
| Vietnam | 1945 | 1,000 | (25) |
| Ukraine (USSR) | 1947 | 2,000 | (36) |
| Ethiopia | 1957-59 | 100 | (80) |
| China | 1959-60 | 30,000 | (3, 7) |
| Ethiopia | 1966-68 | 50 | (80) |
| Biafra (Nigeria) | 1968-70 | 1,500 | (4, 103) |
| Sahel | 1972-74 | 1,000 | (67, 108) |
| Ethiopia | 1973-74 | 250 | (108, 113) |
| | | 600 | (80) |
| Bangladesh | 1974 | 1,000 | (2, 108) |
| Kampuchea | 1975-78 | 2,000 | (111) |
| Uganda | 1980 | 50 | (46) |
| Mozambique | 1983-84 | 150 | (18, 56) |
| Sudan | 1983-85 | 150 | (135) |
| Ethiopia | 1983-85 | 300 | (56, 113) |

*No estimate made.

based on adherence to religious doctrine. Thomas Malthus, although himself a cleric, published a secular essay in 1798 that was influential in relating overpopulation to famine (76). Since then, many of the factors that may contribute to famine vulnerability have formed the basis of a theory of famine. Several analysts have proposed that their theory was limited to a particular place or time. Dando (36) designates five periods in history distinguished by fundamental differences in the cause of famine and by differences in the predominant location of famines (table 2). These broad categories are imprecise with limited implications for current policies, but they contribute to contemporary theory by suggesting some qualifications for the use of historical records.

Many theories attribute famine to a single source (table 3); others are based on elaborate theoretical structures that attempt to account for interactions of that among causes and for threshold effects. These more complex perspectives often draw on models from physics and biology to understand the processes that yield relatively widespread and sudden institutional breakdown (34, 38, 96, 106).

Table 2--Characterization of periods of famine history

| Location | Date | Cause |
|---|---|---|
| Northeast Africa and Middle East | 4000-500 B.C. | Physical |
| Mediterranean Europe | 501-500 A.D. | Transportation |
| Western Europe | 501-1500 | Cultural |
| Eastern Europe | 1501-1700 | Political |
| Asia | 1701-1974 | Overpopulation |

Source: (36).

Table 3--Models of famine based on a single cause

| Cause | References |
|---|---|
| African socialism | (115) |
| Capitalism | (74) |
| Climate | (36, 124) |
| Colonialism | (11) |
| Culture | (36) |
| Cycles | (78, 129) |
| Desertification | (125) |
| Militarism | (115) |
| Overpopulation | (36, 50, 76) |
| Precolonial institutions | (101) |
| Supernatural forces | (80, 136) |
| Transportation | (36) |

The dominant theory of famine causality, as indicated by the policies of most governments, is based on food availability decline (FAD). This approach links famine to an unusual decline in aggregate food available within a country or region. The proximate cause is generally reduced food production due to drought or, less often, due to floods, crop diseases, or pests. This view of famine generates a prevention strategy to stabilize food availability in spite of variation in the food production (140). Development of drought-resistant species, increased food storage, and closer monitoring of aid needs are typical programs within this strategy.

Numerous researchers have criticized the FAD approach. The linkage between climate and famine has been shown to be weak (86) and declining (14). In a rare case of systematic research across time, Buchinskiy, after identifying 60 major droughts in or near Russia between 994 and 1954, found less than a quarter of those droughts were a factor in famine (17). Drought was a major factor in only 16 percent of the Russian famines since 994. Sufficient food to feed India was produced even in the famine years of the 19th century according to the report of the Famine Inquiry Commission of 1880. Regional food supplies were apparently adequate during famines in the Sahel in the early seventies (87, 108), in India's Bengal State in 1943 (108), and in Ethiopia in the seventies (60, 70, 80).

Most of the recent cases where famine was associated with major aggregate declines in food availability cannot be explained on the basis of variation in natural factors. The USSR in 1947 and China in 1959-60 suffered from human actions as much as from nature. Vietnam, Kampuchea, and Biafra (Nigeria) cannot claim natural disaster among the causes of their last famines. Brass (15) emphasizes three points in his critique of the FAD approach: (1) it ignores regional and class differences, (2) it minimizes internal solutions in favor of foreign aid, and (3) it diverts attention from normal suffering of some groups.

The major alternative model has roots in the analysis of various famine commissions in India dating from the last century (16) as well as recent observations (2, 10, 54), but the model was definitively expressed by Sen (108) under his term "entitlement approach." The emphasis here lies in analyzing the rights to food that various groups possess. This approach distinguishes between failures of direct entitlement (loss of rights to food by farmers due to low farm production) and failures of exchange entitlement (loss of rights to food by anyone who normally depends on trade that is no longer available). This view brings price analysis into the heart of the discussion of who suffers during famine.

Mariam's characterization of modern African famine, based on Ethiopian experience between 1955 and 1977, illustrates the range of concerns that emerge from this vantage point (80). One ultimate factor in his analysis is the ascendant petty bourgeoisie, who vigorously promote the commercialization of agriculture. This transformation increases the number of landless and limits the growth potential for much of the remaining peasantry. During drought or some other proximate stress, the government responds slowly to crisis among people who have poor communication with the authorities and little political power. The paradigm suggests that famine protection might come from more democratic government institutions or from more equitable access to productive resources.

The two models are partly reconciled by regarding them as characteristic of different time periods. The FAD model might have been appropriate in an age without recourse to the productivity and redistribution opportunities of today and without pressures from input markets and dependency on output markets. Sen's model represents modern famines better. Watts (137) is precise in his designation of Nigerian famines as results of FAD or not, with precapitalist causes of absolute food shortage giving way after 1900 to colonial famines in which political economy dominates. There is no synthesis, however, that fully reconciles the competing views on what causes famine. Insights from several schools of thought contribute to the analysis of famine structure and effect.

## THE ANATOMY OF FAMINE

Although famine does not typically begin or end abruptly, a series of phenomena caused by crisis or threat of crisis can be delineated. Some of these phenomena are short-lived, such as the drawdown of food stocks. Others are persistent, such as the loss of landownership by some families.

Prevention and response policies can be applied only to those components of famine that can be controlled to some degree. The least controllable components (such as altered population structure) arise from biological or physical processes. Others (such as increased debt commitments) are products of choice, even though the choice was made with limited options. Controllability derives from the possibility that human decisions had a direct impact on famines regardless of who made the decisions.

Watts (137) emphasizes the importance of policymakers to know how reversible various stages of famine are. These stages range, in his analysis, from the easily reversed shift toward drought-resistant foods to permanent outmigration.

Four components of famine, (time of occurrence, duration of occurrence, controllability, and reversibility) provide parameters for describing the anatomy of famine. The structure is clarified by such description because the four parameters are not independent; knowing about one parameter reveals something about another. Table 4 portrays the matrix of all pairs of

Table 4--Matrix of correlations among parameters for famine components

| Parameters | Longer duration | Later occurrence | More reversible | More controllable |
|---|---|---|---|---|
| Longer duration | 1 | + | - | - |
| Later occurrence | + | 1 | - | - |
| More reversible | - | - | 1 | + |
| More controllable | - | - | + | 1 |

\+ indicates positive correlation.
\- indicates negative correlation.
1 indicates identity.

correlations among these parameters. Each element off the diagonal of the matrix is marked to show whether the indicated correlation is positive or negative. Examples for the six possible unordered pairs in the matrix are represented individually by figures 1 through 3.

As crisis deepens with the passage of time, people accept actions that are more difficult to retract and, therefore, that bear additional risk. Figure 1 shows the relationship between time of occurrence and reversibility. The correlation is relatively strong for controllable phenomena. In discussing this relationship, Watts (137, p. 436) also emphasizes that the level of commitment of domestic resources increases with later, more irreversible actions.

Relatively controllable phenomena tend to be reversible, although there are significant exceptions. Revolution, for example, is not a mechanistically determined phenomenon yet, once a revolation has occurred, the prior condition cannot be recovered. More typical is the example of migrating to find work. This action results from a choice that may later be reversed by migrating back. A typical uncontrolled aspect is failure to plant for lack of seed. This inaction soon becomes irreversible.

Famine occurs only if control has been lost. Figure 2 shows the relationship between time of occurrence and controllability. There are also important exceptions to the inverse relationship suggested here because weather and other uncontrolled phenomena contribute to the formation of famine. As a famine progresses, the normal, controlled responses are exhausted before more searching, riskier strategies are implemented.

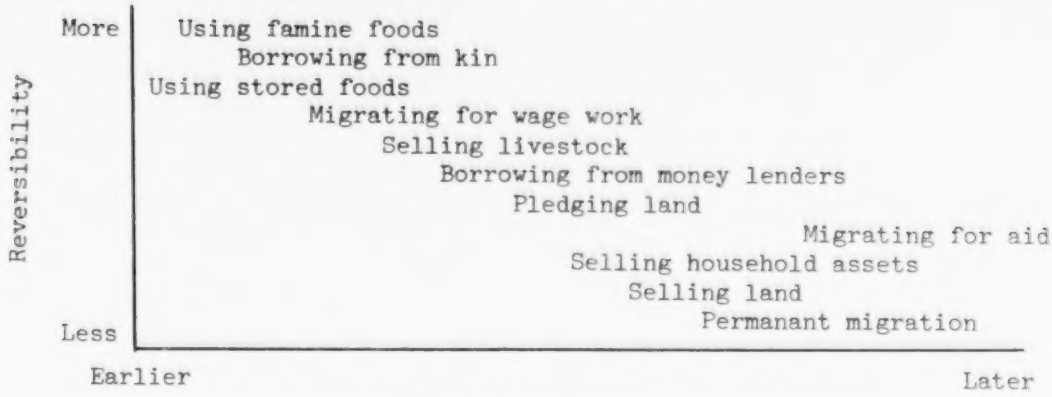
The more enduring actions and effects tend to arise as a famine matures (fig. 3). Among controllable activities (such as food aid) response lags behind need, and the heaviest commitments await stronger justifications. Among uncontrollable phenomena (such as drought) effects accumulate over time, becoming more enduring as famine deepens.

The inverse relationship of duration to controllability arises because more enduring effects tend to be difficult to control. The relationship between duration and reversibility, however, is especially strong because irreversibility logically implies duration.

With this vocabulary, analysts can focus on particular portions of the famine anatomy, cognizant that other portions may be affecting, or may be affected by, those under discussion. Relatively uncontrollable elements in the Ethiopian famine of 1983-85, for example, included drought, small harvests, falling market prices for livestock, rising market prices for grain, increased disease, and widespread starvation. The sequence of uncontrollable elements in the 1967 Biafran famine included rising market prices for all foods, drawdown of food stocks, and deaths of infants and children from malnutrition, mainly kwashiorkor, a protein deficiency disease. In the Kampuchean famine of 1975, almost no aspect other than the biology of death was uncontrollable.

Certain elements tend to occur together although an entire set may not arise in a particular famine. For example, drought is associated with small harvest, food shortages, and migration out of the drought area. There was, however, no drought or other major weather problem in Biafra in 1967 or Kampuchea in 1974. The association of events is also broken when drought fails to generate migration or famine as with the 1976 drought in England.

Figure 1 Reversibility and time of occurrence for actions by famine victims




Source: Adapted from (137).

Figure 2 Controllability and time of occurrence for phenomena during famine

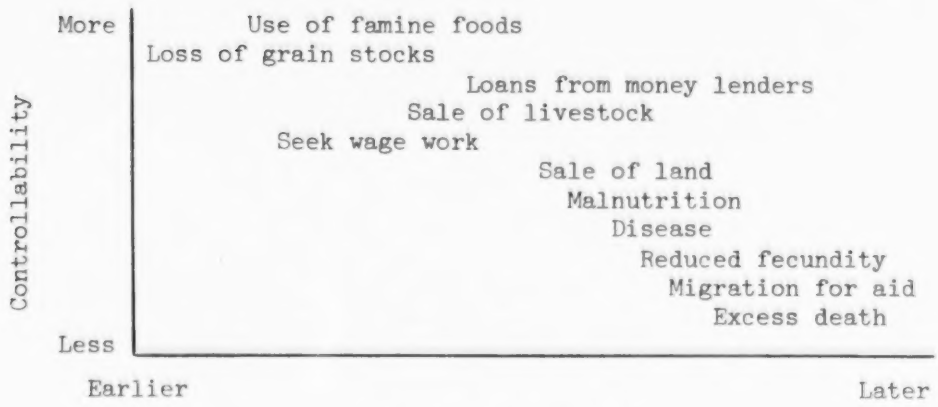
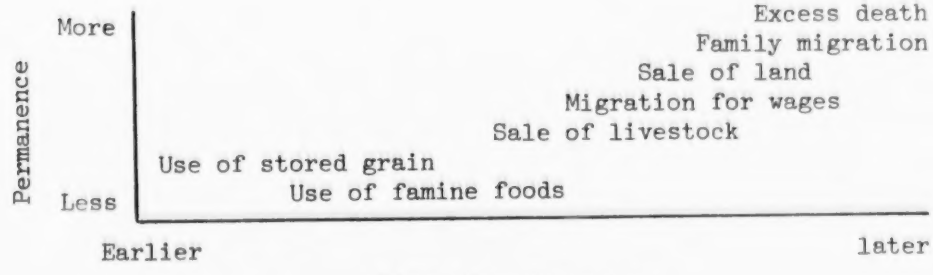



Figure 3 Permanence of effects and time of occurrence for phenomena during famine



Clearly, any general characterization of famine components must either limit itself to nutrition biology or rely upon very abstract description.

Analysis of these sets of characteristics, however, facilitates analysis of specific famines once the included sets are identified. Thus, the following investigation of long-term aspects of famines traces several chains of events that have occurred, even though these chains of events are not possible for all famines.

## LONG-TERM ASPECTS OF FAMINE

The long-term aspects of famine are reviewed here in order to suggest policies to avoid problems and to promote positive aspects. The topics are discussed in approximate progression from least controllable to most controllable, thereby, concluding with aspects that are responsive to policy.

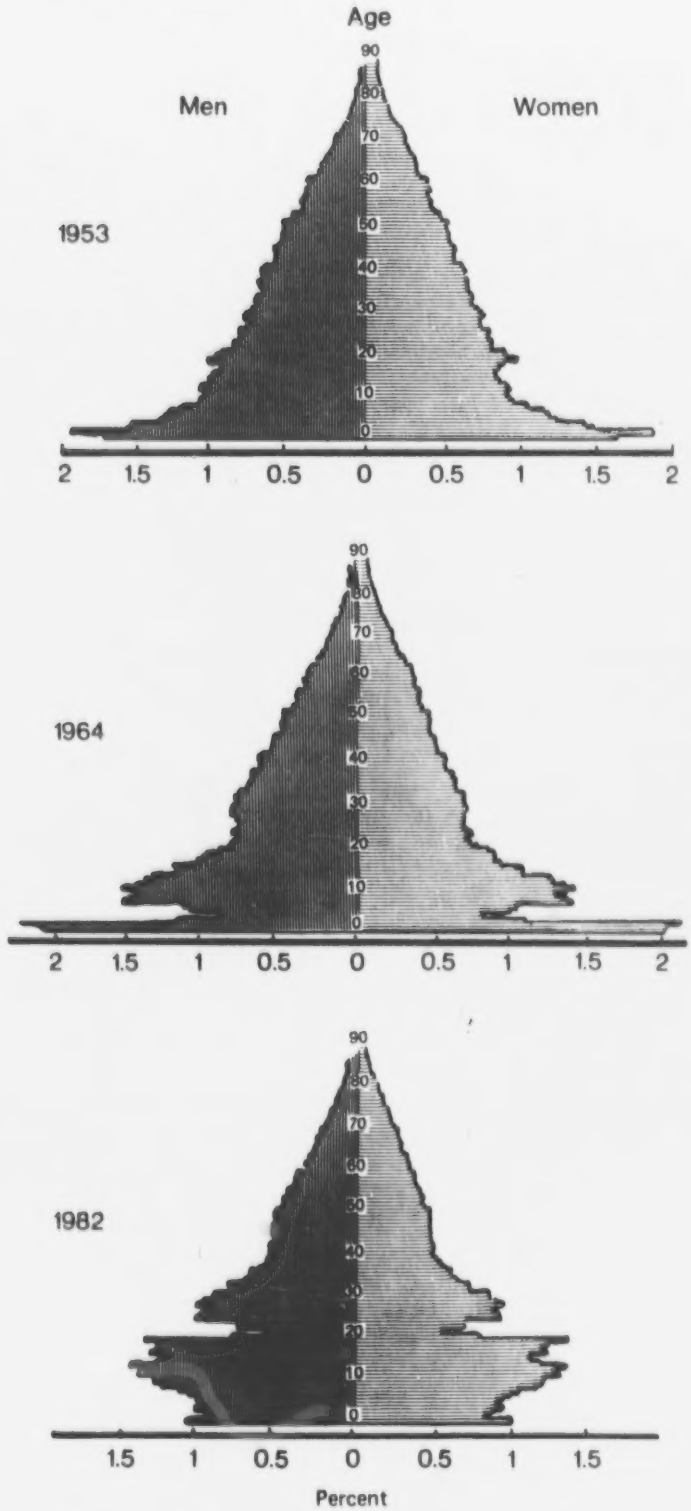
### Distribution of Casualties

Famine is defined by widespread loss of life, altering population structure for many years. Loss of life during a famine is greater for children and the elderly. For example, mortality due to famine among infants in Bangladesh was estimated at 53 percent in 1974-75. In 1980, 61 percent of the infants died in Uganda, compared with 14 percent of the adults (2). Children below 15 years of age accounted for 64 percent of Ethiopia's population before the 1973-74 famine but only 56 percent after; the proportion of children below 5 years of age fell from 18 percent to 11 percent (42). The youngest infants, however, fare better in mortality statistics than their siblings, because they are still breastfeeding and competing less directly with adults (24). Malnutrition is especially dangerous to infants, however, because they are more susceptible to permanent brain damage (6). Loss of aged members does not alter a country's population structure for as long as the loss of children. The loss of aged and infirm people does not generally impede recovery from famine because they are less productive economically (120).

A further effect may arise from a reduction of birth rate beginning 9 months after the onset of famine (13, 65). This reduction could result from the breakup of families (20, p. 48; 58, p. 21), from diminished health of potential parents, and from delayed marriages (104; 120, p. 95; 30, pp. 82-3; 58). Of these three reasons, the effects of reduced health on fecundity is the most controversial. Physical effects of malnutrition are regarded as minor in most cases (12, 13), except in studies of the Dutch crisis in 1944-45 (47, 121). Malnutrition among children, however, may reduce their fecundity, which will be revealed only when they reach child-bearing age (43). The long-term effect of family breakup and delayed marriage may be offset entirely by high birth rates directly following a famine (13, 19, 58). China's annual birth rate was estimated to have declined during famine from 35 per 1,000 in the early fifties to 95 per 1,000 in 1961 (139). This would account for a reduction of 20 million births. The combined effects of reduced birth rate and increased mortality in children is apparent from the 1982 Chinese census data (fig. 4). The number of people missing from the normal pattern who would have been 22 or 23 years old in 1982, is about 1.5 percent of the total population, or nearly 15 million people. No "baby boom" following the famine is revealed by these data.

Death also tends to discriminate by gender during famine, with women generally more affected than men. Men are more likely to migrate first in search of

Figure 4. **Population structure in China**




Source: (98).

work, not necessarily intending to abandon their families but doing so in fact if no savings can be sent back. Most African reports indicate a higher death toll among women, but greater mortality among men was claimed during a 1914 famine in Nigeria (137, p. 292). The ratio of women to men in Wollo, Ethiopia, was 115:100 before the famine and fell to 89:100 by 1974 (42). In India, however, male mortality seems higher, reportedly because women employ more effective coping strategies (85). Male deaths in Bengal, India, were twice that of females in 1876 (61). Male deaths in Bengal increased 62.5 percent, compared with 53.2 percent for females in 1943 (62).

Mortality sometimes differs significantly among occupations. Sen (108) emphasizes that starvation is generally reserved for the poor even during famine, and most researchers recognize increased differences in mortality among classes during famine (34, p. 18). Large landowners and others with wealth are the last to go without food. Death rates for landless people were three times higher than for those with 3 acres (1.21 ha) or more in Bangladesh during 1974-75. The death rate difference between children of landless parents and those of landowners was even more pronounced (24). Most deaths in the Barbados famine of 1647-50 and in the Jamaica famine of 1781 were among slaves (136).

Beyond the effects of income, however, different occupations are affected differently. Where famine results from a shortfall in production, food producers have their income (entitlement) most directly affected. Subsistence producers typically have little to offset their losses. Data from Bengal, India, for 1943 illustrate significantly greater mortality among food producers than wage earners (108, p. 89), although agricultural wage earners were hit hard (88). In Calcutta, the relative disadvantage of rural migrants was abetted by relief programs designed for urbanites (108 p. 56; 53).

Livestock producers are especially vulnerable. About a fifth of the Sahelian population depends on herding activities (131). The quality of the herd deteriorates with the decline of forage during drought, so animals are sold to salvage whatever value remains, regardless of prices. In fact, livestock prices may drop precipitously during drought because of the increase in quantity supplied to the market (84, p. 90; 137, p. 385). Herders are dependent on trade because their livestock holdings are seldom sufficient to directly provide the calories necessary for survival (128). The caloric terms of trade for livestock products versus grains normally favor livestock, but drought-induced price changes for both types of commodities rapidly shift the caloric terms of trade to favor grain.

The impact of famine often varies among ethnic groups. In areas where different ethnic groups have different income levels or occupations, those qualities typically lead to differences in impact. For example, the Afar were hit especially hard among Ethiopian groups in the early seventies (44). When these groups are separated geographically, differences in impact may arise. The Biafran famine in 1967 was experienced primarily by the Ibo because their population in southeastern Nigeria had increased by a million migrants from elsewhere in Nigeria (103). Differences in political power among ethnic groups also contribute to differences in government relief effort. The relatively weak political influence of nomadic groups was apparently a factor in limiting the early response to their problems in the Sahel in the early seventies (112). In 1983-85, the Ethiopian Government was unenthusiastic in providing relief for groups suspected of supporting Eritrean secession (68, 122).

## Desertification

Desertification refers to the expansion of unproductive land area. It results from changing climate and other natural occurrences and from human activity. A lively debate during the seventies on whether long-term climatic change is responsible for desertification in Africa has quieted into a consensus that the recent droughts probably constitute normal rainfall variation within the dominant rainfall pattern of the past 1,000 years (67, p. xxi; 82; 107; 125). There is, however, evidence that growth of desert areas promotes further desertification nearby (23, 89). Thus, human abuse of the environment can promote natural processes of degradation. The 1980 food crisis in northeast Uganda (77, 119) and the famine in Wollo and Tigre, Ethiopia, in 1983-85 (141) were attributed, in part, to environmental destruction. Major floods in China are attributed to cutting of forests and to filling of lakes, but no famine resulted (117).

The view that desertification contributes to famine suffers from a misunderstanding of the pace and scale of desertification, and is no longer widely held by researchers on this topic. Although as much as 60,000 square kilometers may be lost to desert each year in Africa (105), the permanent loss of productive land fails to account for much of the production shortfall in any country or for any famine (125).

The major causes of desertification, deforestation, overgrazing, and overcultivation are found in nonfamine times. Overgrazing and overcultivation may even be reduced during famine, with fewer livestock and less cropping. Nonetheless, famine sometimes accelerates desertification. When famine is associated with drought, the natural environment is especially fragile. Deforestation may increase as collecting firewood gains in value relative to agricultural work. Pastures have lower carrying capacity and the percentage of goats increases because goats consume pasture plants more completely. With less grass and livestock produced, fewer nutrients are recycled. Environmental damage is particularly intense at the remaining water sources, such as wellheads. After the drought, marginal lands are increasingly cultivated by people who sold their cropland during the famine.

## Unplanned Relocation

Large populations often relocate during famine in search of a more favorable location; many do not return after the crisis. Thus, both regional shifts and rural-urban shifts may arise and persist. Unplanned relocation refers to human movements made in response to unusual circumstances according to decisions by individuals or families. This does not include normal seasonal migrations or government resettlement schemes. Unplanned relocations occur at three stages in famine development: before the famine, as food shortages become apparent, and as food shortages become severe.

Relocation prior to a famine may be a potential cause of famine rather than an effect. Large refugee populations contributed significantly to several recent famines. The most apparent of these was in Biafra in which more than a million Ibo moved into southeastern Nigeria in 1966 (103), contributing to conditions in which nearly a million people died from malnutrition over the following 2 years. A similar situation occurred during the secession struggle of Bangladesh from Pakistan in 1971 when 8-10 million refugees entered India. A major relief effort by India, based on its experience with famine and accounting for a fifth of India's annual economic and social development

budget, successfully averted casualties on the scale of famine (4, 99). The Kampuchean famine was also affected by prior relocations. By 1972, 2 million of Kampuchea's 7 million citizens had moved from their homes, many into Phnom Penh, as a result of a civil war. Movement out of the cities was induced by the new government after April 1975, and these migrants suffered especially heavy losses in the subsequent famine (111).

As food shortages become apparent during the early stages of famine, families often send one or more members in search of supplementary wages. In Africa, young males usually move to cities (20, pp. 23-31; 21, p. 180), but female migration to urban areas has also been high in some instances (104). In southern Niger, the proportion of males aged 15-44 working outside the village rose from 33 percent to 75 percent in 1974, mostly at jobs in large cities (43). The effects of crop failures in western India during 1870-1920 also were mitigated by movement to wage-labor areas (83). Young men moved into coffee-growing areas of southern Ethiopia in early 1973, anticipating increased crisis in their home regions (80).

Urbanization in the western Sahel was enhanced by migration in the early twenties (28) and in Chad and Sudan in 1983-85. The proportion of female migrants to urban areas is generally higher in India during famine (33, 97). During the 1943 famine in Bengal, there were twice as many women as men aged 15-20 among the destitute of Calcutta, and more than half of the adult migrants were women (37). In 1974, the proportion of females in Bangladesh relief camps was 51.4 percent, compared with the national proportion of 47.9 percent (85).

This movement of women and their increased participation in wage labor as a result of famine has served to raise the status of women by raising their independence (85). The drastic step of leaving home is generally delayed until it is clear that local resources will be inadequate. Newly discovered opportunities of successful relocation, however, may encourage permanent settlement. The population of Ireland never recovered from the migration during the 1846-49 famine (4). Currey and Hugo found that population growth rates in famine regions have often been more affected by population movement and fecundity responses than by mortality since 1945 (34, p. 10).

At a later stage of famine, remaining family members with sufficient strength for travel may set out in search of food. This movement is a desperate measure which exposes already vulnerable people to additional rigors. Such flight does not occur where it is actively restricted such as in the Kampuchean and Biafran famines. It was a relatively unsuccessful strategy in China during 1959-60 because the disaster was so widespread. Movements in the Sahel immediately before 1975, however, are considered to be the largest migrations the area ever experienced (20) and a major factor in reducing the death toll. Since much of the Sahelian population consisted of nomadic people, flight from famine was only an extension of their normal pattern. This type of movement is less likely to result in permanent relocation although it sometimes has. The Sahelian famine in the 1750's redistributed the Hausa in a pattern still visible today (137, p. 143). Certain villages in Kenya are derived from relief camps created in the 1961 food crisis (119, p. 175). Some Sahelian groups even changed nationality after fleeing from the 1971-74 famine (28), and some new agricultural areas were opened in Indonesia under comparable circumstances (34, p. 24). Fairly rapid return to abandoned areas following improvement in weather was recently observed in Ethiopia (32, 130).

## Microeconomic Changes

Although hunger is prevalent in many parts of the world and famine has been repeated in the Sahel and East Africa within a single generation, famine is not a recurrent experience typical of any modern population (73). Thus, famine brings new experience to the affected individuals, experience that may permanently alter their behavior. In economic terms, famine can bring about a new production function. Examples have been documented for changed tastes in consumption and for changed production technology through both input mix and output mix. Associated with these are changes in risk aversion.

Personal levels of risk aversion are difficult to gauge, even from data in the most developed nations, but increased fear of abject failure is a likely result of famine experience. Governments have shown greater interest in preventing reoccurrence than they did prior to the famine and its horrors. Some of the long-term changes in behavior may be due to increased risk aversion rather than to the presence of new opportunities or to a new perception of existing opportunities. No attempt to separate the effects of this motivation has been done.

People's willingness to accommodate their taste for food during famine has generated surprising controversy. Dando (36, p. 101) claims "cultural food preferences present major barriers to eliminating famine." While suffering severely from protein deficiency during 1968, Biafrans were unable to eat the large amount of Emmenthaler cheese donated by Switzerland, and the cheese was eventually buried (57). Aykroyd (4, p. 63) cites reports stating that during several Indian famines, people starved rather than eat unfamiliar foods. Sen (108) regards such reports during the 1943 famine in Bengal State, India, as a misinterpretation of the evidence. He explained that the starvation observed immediately outside shops selling food was a result of poverty and that the destitute could not afford the food regardless of their desire for it. As victims' health deteriorates, they become unable to prepare or digest certain foods. A further explanation for claims of rejecting food may derive from the mental state typical during the final stages of starvation. People do not decline promptly from food searching to death. Rather, there is a period of exhaustion during which individuals cannot accept food if it becomes available (40).

On the other hand, anecdotes abound about individuals resorting to marginal or submarginal foodstuffs under the pressure of famine. In 1914, for example, there were reports of Nigerians consuming unripe millet even though it caused severe dysentery (137, p. 292), and also consuming herbs and dirt (137, p. 288). In 1973-74, nearly 1,400 people in Gondar, Ethiopia, showed symptoms of having eaten a poisonous type of pea (49). Watts (137) regards changes in diet as one of the earliest stages in combatting hunger. One example is when people eat wild plants that are normally ignored. The Indian Government formally recognized the importance of wild foods by its decision to open government forest reserves for food gathering in Bihar in 1967 (116). Experimentation with and exploitation of wild plants provides lessons that may last for years (110). Shifts in consumption patterns toward foods available from previously unfamiliar markets or from relief operations may also affect long-term preferences (52). Food aid is apparently responsible for raising demand for expensive grains (such as wheat) and infant formula (8).

Famine has induced many enduring changes among the inputs used in agriculture. The loss of life and the movement away from famine areas

reduces, for a time, the amount of labor available. Occupational and gender bias in such regional population losses imply further changes in the labor force. During World War II, the pressure for wage labor by Nigeria's colonial government exacerbated food production problems and the ongoing famine (137, p. 329).

While the overall ratio of land to labor rises during famine, families that sell their land may experience a reduction of that ratio. Considerable centralization of landownership occurs in some famines (22, 20), perhaps furthering capitalist relations and production techniques. Mandani (77) cites the case of a woman who accumulated 500 acres in Uganda largely from the 1980 food crisis. Relative gains in wealth by the wealthy were documented for famine in Nigeria (31) and in the Sahel (29). During 1973-74, however, only 15 percent of Ethiopian families sold or abandoned their land and only 2.6 percent mortgaged their land in the area surveyed by the Relief and Rehabilitation Commission. These figures were considered a sign of their strong attachment to the land (85, p. 62). In many areas, land sale is formally prohibited, but effective ownership and transfers have been established (59, 90). Food-for-work projects have also been cited for their tendency to favor landowners in the long term (119).

Famine was once a time for freeing slaves in the Sahel. Whether by consent of the owner or not, such a crisis led to a reduction in slaveholding as recently as 1907-8 (72; 137, p. 143). Slavery, however, increased during the major Ethiopian famine of 1888-92 because people accepted positions as slaves (94, p. 33).

The changed herd structure creates enduring impacts among populations that depend heavily on livestock. Table 5 shows the theoretical time required to reconstitute various types of herds depending on the percentage lost during famine. Even though fertility is generally high immediately following a drought, due to the high proportion of females and low birth rates in the preceding period, full recovery may require many years (35). The relatively speedy recovery of small stock creates an incentive for producers to shift away from cattle production, further slowing recovery of cattle herds. One strategy for speeding recovery is to reduce milk offtake in support of young animals even though this lowers income.

Actual livestock losses during 1973-74 in the Sahel were estimated at about 30 percent (128). Local losses were sometimes much higher; 80-100 percent were reported in Mali by 1974 (81) and 60-80 percent were reported in Niger by 1976 (137, p. 384). The complete loss of some herds was also observed by Laya (69). In 1985, cattle losses were estimated at 40-90 percent in Mauritania (18) and at 75-90 percent in Sudan (133). In large areas of Ethiopia, losses of 70 percent among oxen and 90 percent among cattle and smaller stock were recorded by 1974 (80, p. 59).

Herd recovery in certain Sahelian countries after 1974 is portrayed in table 6. These data represent the influence of many factors on recovery efforts but are consistent with the theoretical limits shown in table 5.

The combined effects of these microeconomic factors have sometimes been to transform the mode of production. Stress during famine may strengthen feudal relations by obstructing the emergence of independent peasants, but instances of movement toward capitalism are better documented. As discussed earlier, centralization of landownership and migration in search of wages are common

during famines. The pressure of hunger has overcome the resistance of some groups to participate in the commercial economy. In 1914, drought was important in the extension of markets to herders in Nigeria (137, p. 295). The 1927 famine in the Sahel furthered the acceptance of wage labor in spite of previously existing cultural barriers (137, p. 312).

Table 5--Time required to reconstitute herds

| Type of herd | Lost during famine | Time required to reconstitute |
|---|---|---|
| | Percent | Years |
| Cattle | 20 | 3 |
| | 40 | 12 |
| | 60 | 30 |
| | 80 | 61 |
| Goats | 70 | 8 |
| Oxen | 10 | 2 |
| | 30 | 5 |
| | 75 | 9 |

Sources: (123), (128).

Table 6--Herd recovery in the Sahel

| Country and type of herd | Livestock inventory | | |
|---|---|---|---|
| | 1972 | 1974 | 1982/83 |
| | Million head | | |
| Burkina Faso: | | | |
| Cattle | 2.40 | 1.60 | 2.95 |
| Small stock | 4.05 | 3.00 | 4.50 |
| Mali: | | | |
| Cattle | 5.40 | 3.70 | 5.40 |
| Small stock | 11.18 | 7.70 | 3.95 |
| Senegal: | | | |
| Cattle | 2.51 | 2.32 | 2.33 |
| Small stock | 2.70 | 2.53 | 3.36 |

Source: (128).

## Dependency

Dependency effects result when Third World nations serve the interests of more powerful nations in place of their own development (55). Dependency may make some nations more vulnerable to famine by slowing economic development or by promoting underdevelopment (66). Even among governments and researchers who do not generally accept dependency theory as an analytical tool, similar prescriptions are reached for serving the goal of food self-sufficiency in developing nations. Recommendations to promote regional or national self-sufficiency following the 1970-74 drought in the Sahel came from the World Bank, the Food and Agriculture Organization (FAO), the U.S. Agency for International Development (AID), the United Nations Development Program, the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS), and others (67, p. 70; 51).

Certain dependent relations may contribute more directly than others to famine. For example, trade linkages with South Africa, North America, and Europe have been so dominant in Africa that intraregional transportation and marketing networks never developed efficient formal structure. This shortcoming has been recognized by numerous organizations attempting unsuccessfully to promote regional integration. Examples include the East Africa Community, the Economic Community of West African States (ECOWAS), and the Southern African Development Coordination Council (SADCC). When local food shortages arise, relief from outside the region is cheaper than redistributing local supplies. Sen (108) reports that there was apparently enough food within each Sahelian country in 1968-73, except Mauritania, to meet biological needs. Hussein (60) reports the same for Ethiopia during that period. Similarly, international food aid to Bihar, India, apparently replaced regional redistribution of available food in 1966-67 (15, p. 259), just as it did in Kenya in 1980-81 (119, p. 172). Regional integration was recommended as a strategy for African food security in AID's 1983 report (131).

Dependency may also contribute to famine by promoting cash crops whose exchange value typically varies more than the value of food crops (66). In Ethiopia, expansion of commercial farming significantly reduced the resources traditionally available to pastoralists just before the famine in the early seventies (9, 44). Emphasis on cotton production and the vagaries of the cotton market in Chad contributed significantly to the 1984-85 crisis (143). Agricultural exports have remained stable or increased during famine because of the relative security and high priority of such operations (71, 114). The largest cotton crop since 1973 was harvested in 1983 in Sudan (132). During droughts, however, peasant cash crops have tended to decline even with favorable prices because the peasants preferred the security of food crops (39).

In addition to the dependency relations which function through international markets for commodities and financing are those that arise from aid transfers. Just as food-aid dependency may contribute to famine vulnerability, food crisis may contribute to long-term dependency. Records of food aid transfers indicate that aid which was raised in response to emergency conditions was maintained for many years after the crisis was past in Haiti after the 1954 hurricane, in the People's Republic of Yemen after 1972, and in Bangladesh after 1975 (63, p. 18).

International cooperation often seems to improve during a famine, but trade and aid even then may be used to further dependent relations. Agricultural-

ists and members of the aid bureaucracy in donor nations tend to promote food aid beyond its usefulness. Food prices tend to drop while large food aid imports are being received, and these prices are prone to remain well after the famine period, reducing entitlement of local producers and the incentive for local production (126, p. 289). This led to reduced plantings and reduced production in Mali (138) and Togo (5) during 1986. Overenthusiastic food aid also went to Guatemala following an earthquake even though food supplies were already adequate, reducing prices by 30 percent (8).

U.S. food aid was temporarily withdrawn from famines because of U.S. politics in Kampuchea in 1975 (111) and Bangladesh in 1974 (108, p, 136; 113, p. 5). In the year of greatest need in the Sahel, fiscal 1973, two-thirds of U.S. disaster relief was allocated to Vietman before the Sahelian requests were considered (67, p. 10). British emergency aid has also responded strongly to domestic politics to the detriment of recipients (92).

These examples of perverse assistance during famine contrast with the predominantly favorable impact of emergency aid. Indeed, emergency aid has been less prone to such abuses than other forms of international relations (63). Yet, these experiences serve warning that the passionate generosity engendered by famine may conflict with longstanding interests that are likely to control the institutions of international relations both before and after crisis.

The long-term results of famine episodes on dependency have been strongly positive in some cases and strongly negative in others. Among the positive results, the intense influx of aid during a crisis has enhanced the capacity of local bureaucracies. During 1970-74, foreign aid bureaucracies virtually supplanted local Sahel governments, but in 1983-85, local officials insisted on retaining full authority and they served effectively. Regional cooperation may have been enhanced in 1983-85 by the heavy flow of aid through Nigeria to Niger and Chad. At first, Nigeria was accused of obstructing aid movement although they claimed their transport capacity was being exceeded. Later there was agreement that Nigeria was facilitating passage of aid to its landlocked neighbors.

Among the possible negative effects of famine on dependency are a number of effects collectively known as "the culture of aid" (79). Famine victims whose lives were saved by aid may regard foreign assistance as a long-term alternative to the work whose failure led to famine (63, p. 16). Governing regimes find their budget swollen with emergency assistance funds and may seek to retain the power wielded during the crisis. Foreign personnel engaged in relief operations find their own importance and support decline as the crisis passes so they have reason to institutionalize aid programs. At all times, there are groups other than those actively targeted who benefit from aid. These groups during an emergency experience a surge of power which they may relinquish grudgingly. For example, during the 1980 food crisis in northwest Kenya, individuals from other parts of the country were brought into the area to administer relief programs. Some individuals used their positions to develop a personal power base which challenged traditional authorities even after the crisis was past (11, p. 165). A similar change in village leadership was induced by emergency aid to Guatemala in 1977 (48, 102).

## Change In State

Perhaps the most conspicuous of enduring famine outcomes are the new governments that have arisen. The fall of four early Chinese dynasties has been

attributed to pressure from famine (118). Without attempting to distinguish among coups, revolutions, and counterrevolutions, we can recognize many recent cases in which food emergencies were associated with a change in state. The correlation between attempts to change the holders of state power and famine is high, but generalizations about how one phenomenon contributes to the other are not clear. In most cases, civil war or the threat of invasion preceded famine, but in several instances, famine appears to have weakened the state enough to permit new forces to gain control.

Food shortages during World War II were caused by intentional blockades in the Netherlands and Greece. The disruption of normal trading patterns during the war was a major factor causing the famines in Bengal State, India, in 1943 and Vietnam in 1945. The loss of capital and labor in the war also contributed significantly to the 1947 famine in the Ukraine. More recently, new, inexperienced governments followed policies which exacerbated famine in China during 1959-60 and Kampuchea in 1975-78. Unsuccessful civil wars induced or aggravated famine in Biafra during 1967 and in Mozambique, Chad, Ethiopia, and Sudan during 1983-85.

The precise mechanism through which famine provokes a change in state rather than vice versa differs with each case. The occurrences share, however, a loss of power by the ruling regime as popular faith is eroded by crisis regardless of confidence prior to famine. Furthermore, none of the state changes was brought about directly by starving masses. In Dirks' report, he breaks down individual starvation into stages of alarm, resistance, and exhaustion (40). Organized rebellion is considered most likely during the first stage as immediate personal needs eventually predominate. Mariam feels that the Ethiopian peasantry has never sought revolution because they have so little food that they cannot afford to cease the immediate struggle for food (80, pp. 18-19). Examples where food crises were important include the overthrow of President Diori in Niger and of Emperor Haile Selassie in Ethiopia during 1974, of President Tolbert in Liberia during 1978, and of President Nymieri in Sudan during 1985. In 1984, the United States was accused of withholding aid to Ethiopia in order to promote a change of government (41, 70) although eventually aid shipments from the United States were generous compared with aid from other sources (45).

## Macroeconomic Changes

Numerous marginal changes in the macroeconomy may be induced by famine. Most of the impacts placed in this category operate through the government and are, therefore, consciously promoted, with famine acting to instigate or catalyze the changes. Some are direct alternatives to changes of state since they occur in the bureaucracy in response to weaknesses perceived in crisis. Others are programs designed to respond to long-term needs recognized in famine.

The first criticism leveled against the official administration in a famine area usually concerns its reporting of the crisis. Disasters which developed to an intensity sufficient to warrant the title "famine" would not have surprised any observer with access to the relevant indicators. Yet, the death rate typically rises because adequate relief efforts are not taken in the early stages. In some countries (such as the USSR in 1947 and China in 1959-60), foreign aid was not sought for reasons of international politics. In several cases, the true extent of the crisis was withheld from national leaders because of internal bureaucratic incentives. The delays and falsifications of information by lower level officials have been described in detail

for China in 1959-60 (134) and for Ethiopia in 1973-75 (80). Internal political maneuvering led to the understatement of the food crisis by the government in Bihar, India, during the 1966 election campaign. When the new party came to power, however, it overstated the crisis (15).

Overstatement is a strategy used to elicit outside assistance by governments and international relief organizations. The president of the World Bank, for example, described the 1983-85 African famine as "the biggest disaster since World War II." Although his words may be defended as a reference to the continental development problems, they convey a message which is not strictly accurate. Once a government receives relief support in response to such descriptions, it has a tendency to continue to overstate its need. Several governments have so consistently claimed food crises that their statistics carry little weight. Mali has been prone to claim needs in excess of its absorptive capacity. In 1985, Mali estimated a food grain deficit of 481,000 tons (26) but subsequently complained about a food glut provoked by 259,000 tons they actually received (68). Although numerous countries have not greatly improved their capacity to monitor crisis, two of the largest, China and India, effectively altered their bureaucratic procedures in recognition of their inability to respond to famine.

China, India, and the Soviet Union have adopted food distribution strategies which are not feasible in smaller countries. Regional economic integration has not been successful, but permanent institutions to organize relations between Sahelian countries and developed countries did emerge from the 1972-74 famine. The Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) was formed of Sahelian countries and, later, the Club du Sahel was formed of potential donor nations. These two organizations were active on famine issues through the years without crisis and facilitated effective response to the situation in 1982-85. In 1986, six countries of eastern Africa formed the Inter-Governmental Authority Against Drought and for Development (IGADD) (142).

Specific programs have been established more or less directly as a result of famines. Many of these programs might have been justified under general development objectives but were strengthened politically as famine prevention. Mandatory manioc production was introduced in the highlands of Zaire to avert future famine following the food crisis of 1929 (64). The Famine Commission in China undertook road building, flood control, irrigation, and census operations in the twenties (75). Rural credit cooperatives in China were designed after a scheme for famine prevention in Germany begun in 1848 (75, p. 129).

Planned relocation into undeveloped areas is easier after famine because people's lives are already disrupted and their traditional homes are associated with disaster. New areas were settled in Manchuria, China, as a result of national policy following famines early in this century (75). Over 100,000 people were moved south within Somalia after the 1974 famine. The Ethiopian Government moved people from famine areas to relatively productive lands in the south and west. By the end of 1985, 560,000 Ethiopians had been moved of a planned 1.5 million by 1988 (122, 141).

## CONCLUSIONS

Famine is defined by extremely high death rates from food deficiency. This definition serves well, when data are available, to distinguish famine from

nonfamine episodes, but it is insufficient to specify a starting point or ending point for a famine. Although the cataclysm of deaths may occur over an easily recognized several months or few years, the famine episode is generally considered to be longer than that. Famine is studied as a process defined by its sad climax, but rooted in vulnerability which is visible long before disaster. This paper looks past the deaths, even past the immediate recovery period, at the relatively permanent results.

By considering the diverse situations that led to or followed a similar climax, this report shows that famines have only weak linkages to specific causes and effects. Protection against drought, civil war, or price changes would each be insufficient protection against famine. The lengthy list of possible causes and effects must bewilder any policymaker attempting to provide security specifically directed to each point. Safety comes, instead, from controlling the processes that disrupt food production or distribution so intensely that thousands or millions of people die and the economy suffers undesirable effects lasting a generation or more.

Several of the elements which constitute famine emerge as critical for determining the outcome of food crisis. These elements differ from causal factors because they share an institutional setting even while differing in effect. Some elements offer positive effects, some negative, some both simultaneously; some effects can only be evaluated as good or bad from particular points of view. The various forms of human migration associated with famine provide a clear example.

Migration from food deficit areas by nomadic people continues to be a common and successful strategy for mitigating food crisis. Migration by normally sedentary people is often an act of desperation, resulting in additional physical rigors, destruction of families, irreversible loss of capital, and dependence on assistance. Migration policy must contend with this complex set of possibilities. The success of nomadic migrants should alert local governments to the importance of preserving this option. A relatively easy procedure for protection from famine is to retain grazing rights over reserve lands or to provide for automatic expansion of grazing rights in times of need. In areas where famine might contribute to desertification, planned relocation and the facilitation of spontaneous population movements might mitigate long-term damage.

Monitoring human movements might be more effective than measuring aggregate food production for discovering whether people are finding normal food sources to be inadequate. Early attention to unusual forms of movement might prevent irreversible commitments that destroy family structure and prior production arrangements. If land is available elsewhere and the food crisis is great enough, people may be willing to relocate if family or village units are kept intact. When emergency assistance is provided, it should be distributed in existing population locations to avoid migration to camps. Employment projects should be located to minimize migration. Employment projects can be started early in the famine process and expanded if and when need arises.

Dependency issues also integrate a variety of contradictory forces. A sudden rise in foreign aid may weaken existing state institutions by either providing alternative administration or by burdening them with excessive demands. Emergency aid may, however, strengthen government institutions by supplying resources for allocation by local authorities. The self-interest of local bureaucrats and the interests of famine victims are served by recognizing the

limits of the local administration. Incentive structures that maximize both local power and foreign assistance should be supplemented by programs that monitor program effectiveness and balance the donors' desire for control with local needs for administrative assistance.

Another contradiction surrounds the decision to terminate foreign relief operations. Foreign aid institutions may seek permanent status justified by programs to prevent recurrent food crisis even though they are replacing local authority. Permanent international organizations, however, can be effective tools for protecting against aggregate food shortage and even for asserting independence from specific dominant nations. It is important to keep short the lifespan of institutions set up for relief, but food crisis can be used to revitalize multilateral organizations. Organizations for regional trade, in particular, have potential for strengthening themselves during food crisis and reducing dependency in the long term. Food imported from neighboring regions tends to be similar to traditional foods, avoiding problems of acceptance and of changing tastes. Using emergency aid to increase intraregional trade would develop channels that might reduce the likelihood of future crises.

The third area of concentration on which the events of famine converge is in state control. Food crisis may be used to change the state or to protect the regime already in power although the famine victims are unlikely to play a direct role as defenders or rebels. Change in holders of state power is of paramount importance for protecting a nation from future food crisis. The criteria for choosing among possible regimes depend on so many considerations other than food security that they remain beyond the scope of this report.

Several long-term impacts of famine are consequences of the uneven distribution of stress and of relief. Efforts to target emergency aid to women, children, the elderly, or the poorest have often been frustrated (63). Being able to recognize who is suffering the most is essential for a systematic response to a crisis. Vulnerable groups should be formally monitored although a government commitment to their security can only be assured through their political participation. Several strategies have proved effective in protecting against long-term damage among the most vulnerable groups. Maintaining price ceilings on grains and price floors on livestock reduces the tendency of the market to exacerbate suffering during food production declines. Emergency credit, food storage, and other programs, which impede the transition from shortage to famine, reduce long-term effects derived from the most desperate and irreversible acts associated with immediate threat of starvation. Protection against loss of access to means of production, especially loss of landownship, is also critical to avoid persistent need for assistance even after aggregate productive capacity recovers.

Most other lasting results of famine may be treated by increased emphasis on the rural economy by national development efforts. Famine may underscore the importance of food security so that political leaders will favor rural projects during and immediately after a famine. Employment activities undertaken as relief can focus on soil and water conservation, road and storage unit construction, and other rural projects that will directly benefit famine victims in the long term, while improving aggregate food security.

In today's world, no large population is so dependent on local natural resources that a failure of nature must lead to famine. Famines, however, continue to occur and to greatly disrupt national development for many years. The long-term effects of famine, however, can be anticipated and, in part,

manipulated. Modern famines are fundamentally a result of social forces, and the experience of people throughout the world should offer insights for analyzing the famine phenomenon. Policies effected before, during, and after famine episodes should avoid the damage and promote the progress that can follow famines.

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